

Native American and Pacific Islander Research Experience (NAPIRE) Program at Las Cruces Biological Station, Costa Rica

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With funding from the National Science Foundation, LSAMP Program, the Organization for Tropical Studies (OTS) initiated the first 8-week NAPIRE (Native American and Pacific Islander Research Experience) Program in the summer of 2006. Based at OTS' Las Cruces Biological Station in Southern Costa Rica, NAPIRE emphasized multidisciplinary experiences in which students were introduced to patterns and processes of tropical ecosystems, worked on group research projects, and met with members of local native communities to learn about conservation dilemmas in the tropics.

Five research mentors from five universities worked closely with the students on the completion of independent projects in field tropical ecology. Students contributed fully to all aspects of project development including definition of questions and hypotheses, experimental design, data collection and analysis, and final write up and interpretation. Project results were presented in both written and oral format following the protocol of scientific articles and professional meetings.

Student projects reflected the variety of research opportunities available at Las Cruces, focusing on topics ranging from the role of logs in forest succession to assessment of water quality in the nearby Guaymi Indigenous Reserve. In addition to the research experience, the program included two weeks of travel throughout Costa Rica, allowing the students to experience a variety of tropical environments as well as to meet with indigenous communities of the country. The NAPIRE group visited highland ecosystems such as cloud forest and paramo, as well as lowland wet forest on the Atlantic slope of Costa Rica and lowland dry forest on the Pacific slope. Students learned about contemporary indigenous issues through cultural encounters with the Boruca, Guaymi and Bribri tribes, and had a look at indigenous history in important pre-Colombian sites such as Guayabo National Monument.

Abstracts of the students' research projects are below.

The Role of Logs in Tropical Succession
Sheena Hillstrom, Washington State University
Mentor: Dr. Chris Peterson, University of Georgia

Given the extent of deforestation in tropical environments, the question of how to best facilitate regeneration of key tropical ecosystems has become an increasingly important research priority. This project studied differences in germination, survival and growth patterns between log and soil microsites. Although a tendency for woody species to establish preferentially on logs was detected, analysis of existing data and an original germination study in abandoned pastures revealed no differences in germination, growth or survival. Ms. Hillstrom concluded that

differences in establishment may be due to factors not considered in her study, such as dispersal patterns.

Herbivory of Two Restoration Sites in Southern Costa Rica

Megan Deffner, University of Hawaii

Mentor: Dr. Catherine Lindell, Michigan State University

Forest restoration efforts often depend on planting native tree species to facilitate the successional process. This project assessed susceptibility to herbivory of four tree species commonly planted at restoration sites near Las Cruces, *Vochysia guatamalensis*, *Erythrina poeppigiana*, *Terminalia amazonia* and *Inga edulis*. Two of these species, *I. edulis* and *V. guatamalensis*, were determined to have higher rates of folivory. In the case of *V. guatamalensis*, the data indicated leaf cutter ants as the primary contributor to loss of leaf area.

Arthropod Biodiversity and Nectar Production of Inga Edulis

Monica Pamaska, College of Menominee Nation

Mentor: Dr. Catherine Lindell, Michigan State University

By attracting predators and parasites of herbivores, extrafloral nectaries often function to protect tropical plants from herbivory. This project investigated the ability of extrafloral nectaries in *Inga edulis*, a tree commonly planted in forest restoration plots, to attract arthropods. The results indicated the diversity of arthropods on the plants varied with respect to the design of the restoration plots.

Territorial Species Behavior in Various Habitats.

Ryanna Fernandez, University of Hawaii at Manoa

Mentor: Viviana Ruiz-Gutierrez, Cornell University

Habitat alteration can have important effects on the behavior of forest species. This study investigated territorial behavior of three species of birds in different habitats, including regenerating forest and primary forest. Dominant birds showed a greater tendency to occupy and defend altered habitats, suggesting that access to patches of secondary growth may be important for at least some forest species.

A Study of Phytotelmic Communities in Costa Rica

Sarah Kissoon, Haskell Indian Nations University and

Tanya Tavares, University of Hawaii

Mentor: Dr. Ray Petersen, Howard University

Many species of plants in the tropics have developed structures that hold small pools of water. These pools provide important habitats for a stunning variety of micro- and macro-invertebrates. This research studied these fascinating communities in three species of plants at Las Cruces, *Vriesea imperialis* and *Neoregelia sp.* (both in the Bromeliaceae family) and *Heliconia bihai* (in the family Heliconiaceae). Through a combination of field and laboratory observations, data were collected to clarify feeding relationships between the various species inhabiting phytotelms.

Measuring Water Quality in the Guaymi Forest Reserve of Coto Brus

Annalee Herrera, University of Washington and

Trisha Soares, University of Hawaii at Hilo

Mentor: Dr. Jane Hill, Yale University

Indigenous communities of Costa Rica often have limited access to public services such as treated drinking water. This project investigated the implications of this situation in the context of the Guaymi Indigenous Reserve located near Las Cruces. Collecting along the community water supply, the students found microbes present in 100% of their samples. Observing that gastrointestinal diseases are the most common ailments reported in the Guaymi community, they concluded that the water supply is likely contaminated with coliforms.

The Organization for Tropical Studies (OTS) is a nonprofit consortium of 62 universities, colleges and research institutions. OTS conducts graduate and undergraduate educational programs in tropical biology, coordinates and facilitates field research, owns and operates three field stations (La Selva, Las Cruces, and the Palo Verde Biological Stations) in contrasting life zones in Costa Rica, and works in cooperation with governmental and partner agencies on issues of conservation, environmental education, and natural resource management. For more information on OTS and its programs, go to www.ots.duke.edu.



Photo 1. Ryanna Fernandez with one of her study organisms.



Photo 2. Trisha Soares (left) and Anna Lee Herrera (right) run a water sample through a filter in search of aquatic microbes.



Photo 3. Sheena Hillstrom (right) takes a lunch break in the field with her mentor Chris Peterson (center) and graduate student Luanne Prevost (left).

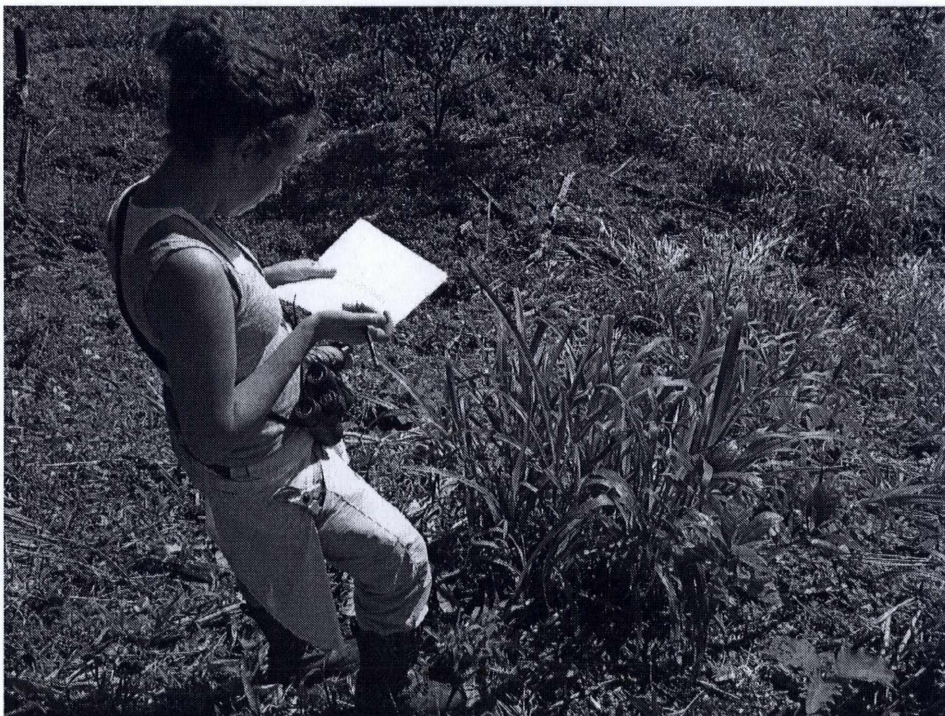


Photo 4. Megan Deffner reviews her field data.

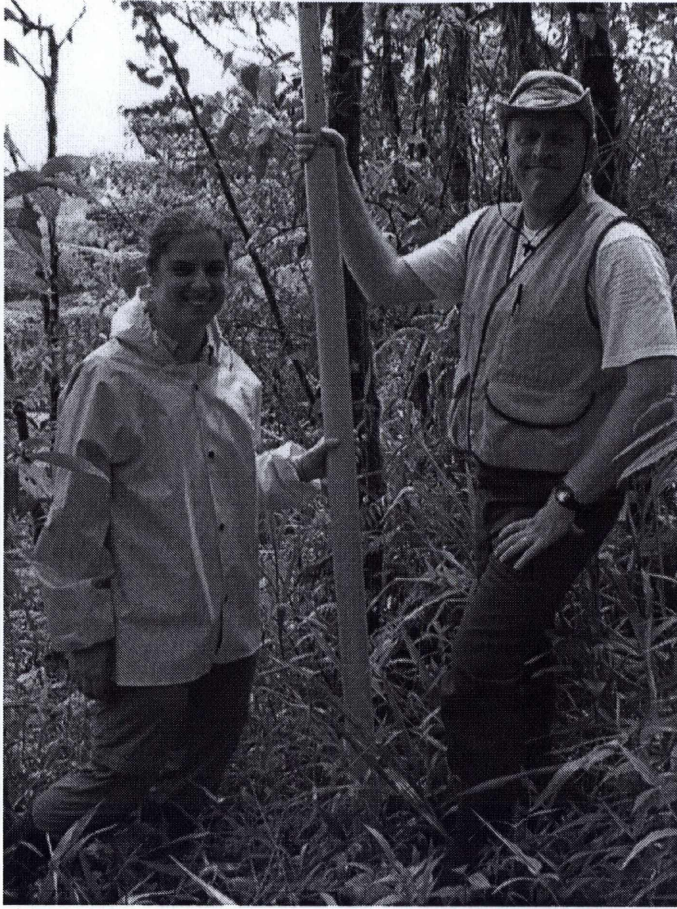


Photo 5. Sheena Hillstrom measures tree growth with mentor Chris Peterson.

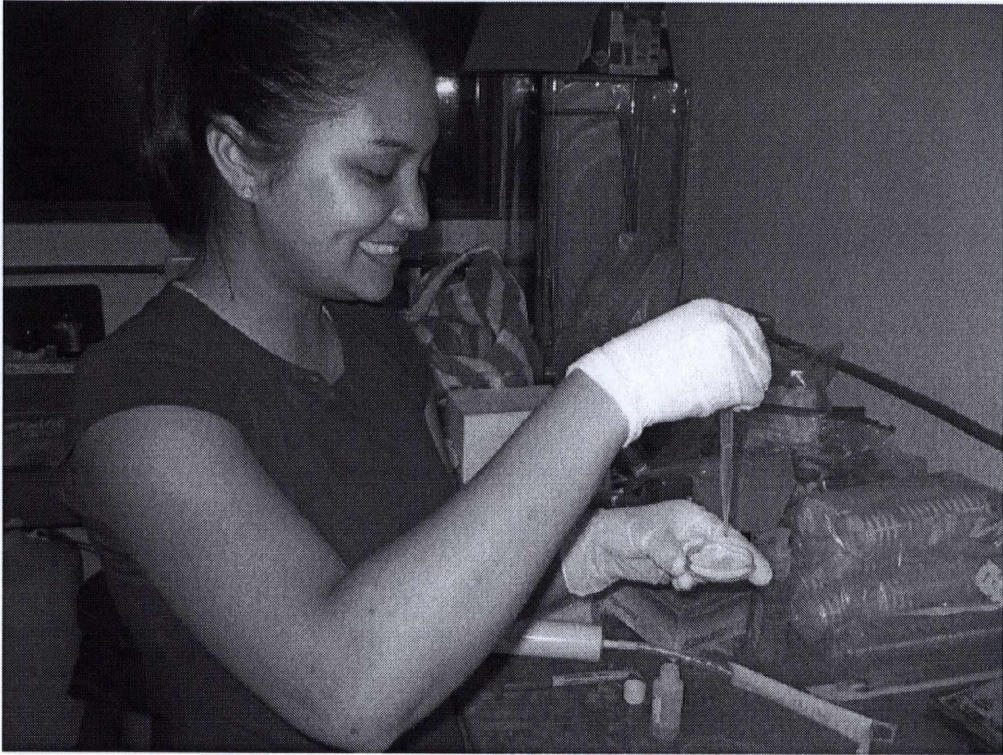


Photo 6. Anna Lee Herrera tests for microbes in water samples from the Guaymi Reservation.

